

We claim:

1. Multipart pump head, comprising at least three rigid plates, said at least three rigid plates comprising two outer plates (201, 205) and one inner plate (203),
5 and at least two elastic diaphragms (204, 202) arranged between these plates (201, 203, 205), the plates (201, 203, 205) forming at least one pumping chamber (211) and at least two shut-off chambers (210, 212), in the geometry of a spherical segment, a spherical zone, a cylinder or a truncated cone, each with an inlet orifice (240) and an outlet orifice (241) for feed material, and the
10 pumping chamber (211) and the shut-off chambers (210, 212) forming, together with an inlet duct (207), connecting ducts (208) and (209) and an outlet duct (206), a passage duct, the pumping chamber (211) and the shut-off chambers (210, 212) being separated by the diaphragms (204, 202) in each case into a product space (230, 231, 232) and a control space (220, 221, 222),
15 and the control spaces (220, 221, 222) having control lines (119, 120, 121) which are connected to a control unit (100, 115), wherein the control space of at least one pumping chamber is enlarged sufficiently to accommodate an axially movable disc (1001) with an extended rod (1002) attached on one side, which is inserted into said control space, with the rod attached on one side of the movable disc extending through the outer plate and projecting
20 outside the head and is adjustable (1003) outside the pump, whereby the disc (1001) located in the control space is movable axially to reduce or increase the maximum diaphragm travel in the pumping chamber, so that the liquid volume conveyed per conveying stroke can be varied and the pump is
25 operable in a part-stroke operating mode, without the dead-space volume in the product space being increased.
2. Diaphragm pump with a multipart pump head according to Claim 1, wherein said diaphragm pump has a decentral electropneumatic control unit.

3. Diaphragm pump according to Claim 2, wherein the pump has a product space (231) defined, in part, by a surface having a vertex and a groove (213) which runs from the vertex of the product space to the outlet orifice.
- 5 4. Diaphragm pump according to Claim 2, wherein the pumping chamber (211) and the shut-off chambers (210, 212) are sealed by means of the diaphragms (204, 202).
- 10 5. Diaphragm pump according to Claim 2, wherein the diaphragms (204, 202) are of an elastic material.
- 15 6. Diaphragm pump according to Claim 2, wherein the pump is comprised of at least three plates (201, 203, 205), and the pumping chamber (211) and the shut-off chambers (210, 212) are formed by depressions (210', 211', 212') in the plates (201, 203, 205).
- 20 7. Diaphragm pump according to Claim 2, wherein the movable disc (1001) on the side facing the diaphragm is planar or has an obtuse cone or is adapted to the shape of the product-side pumping chamber and is provided with a plurality of bores (1007).
- 25 8. Diaphragm pump according to Claim 2, wherein the diaphragm (204) of the pumping chamber is a chambered diaphragm.
- 25 9. Diaphragm pump according to Claim 2, wherein it is a double diaphragm pump which consists of three plates and in which all the pumping and shut-off chambers are formed in the middle plate.
- 30 10. Diaphragm according to Claim 2, wherein in the middle plate four shut-off chambers (1200, 1201, 1202, 1203) are associated with said at least one pumping chamber (1205).

11. Diaphragm pump according to Claim 2, consisting of three plates and operable as a multi-way distributor valve.
- 5 12. A multi-way distributor valve, characterized in that the latter comprised of the diaphragm pump of Claim 11 having a central material inlet duct (1308'), a distributor chamber (1310') and a multiplicity of connecting ducts (1312') having associated shut-off chambers (1314') and following outlet ducts (1316').
- 10 13. Multiduct diaphragm valve comprised of the multipart pump head of Claim 1, having three plates, wherein a distributor chamber is connected by means of an inlet duct via a connecting duct to at least one shut-off chamber which has an outlet duct, and the chambers have depressions of identical size and can be activated separately, so that, for the passage of a material, at least two
15 chambers must be opened simultaneously in the desired throughflow direction, and all the chambers are actuated by a decentral control unit.
14. Diaphragm pump according to Claim 2, wherein at least one outer plate is thermally controllable.
- 20 15. Diaphragm pump according to Claim 2 further comprising controllable valves along with a decentral control unit, wherein, in the throughflow direction through the pump, the inlet duct with a throughflow shut-off chamber and a connecting duct to the pumping chamber has a larger hydraulic cross section
25 than the discharging connecting duct with a following shut-off chamber and outlet duct.
16. Diaphragm pump according to Claim 2 with controllable valves and with a decentral control unit, wherein the volume of the pumping chamber is in the
30 range of 0.005 ml to 1000 ml.

17. Diaphragm pump according to Claim 2, with controllable valves along with a decentral control unit, wherein the product-side dead-space volume of the pumping chamber is 0,1% to 20% of the pumping chamber volume.
- 5 18. Diaphragm pump according to Claim 2, wherein the product spaces of the shut-off chambers (210, 212) are designed smaller than the product space of the pumping chamber (211).
- 10 19. Diaphragm pump according to Claim 2, wherein at least one pumping chamber is provided in the middle plate, and at least three smaller shut-off chambers are associated with each pumping chamber and each shut-off chamber has a connecting duct to the pumping chamber and an inlet duct or outlet duct for the supply or discharge of at least one fluid, and all the chambers are separately activatable via a decentral control unit.
- 15 20. Diaphragm pump according to Claim 2, wherein a plurality of inlet or outlet ducts with shut-off chambers are associated with a pumping chamber and a mixing chamber is provided in at least one outlet duct, said mixing chamber being associated with a second pumping chamber with a plurality of inlet and outlet ducts and shut-off chambers, adapted to pump around a sample intercepted in the mixing chamber, so that, when a separate diluting agent is supplied into the mixing chamber, the sample located there can be diluted or mixed, in order, after mixing, to extract the diluted sample by pumping it away and to analyze it.
- 20 21. A sampling system or conveying device comprising the diaphragm pump of Claim 2.
- 25 22. A method for conveying liquids with a viscosity range of 0.001 Pas to 10 Pas, which comprises conveying said liquids with a diaphragm pump of Claim 1.
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23. A decanting appliance or decanting system comprising the diaphragm pump of Claim 1.
- 5 24. Diaphragm pump according to Claim 5, wherein said elastic material is an elastomer, silicone, fluoroelastomer, polytetrafluoroethylene or a rubber.
25. Diaphragm pump according to Claim 5, wherein said elastic material is comprised of at least two interconnected material layers having different moduli of elasticity.
- 10 26. Diaphragm pump according to Claim 1, wherein the travel of one or more of the diaphragms which separate the product space (231) and control space (221) of the pumping chamber (211) or the product spaces (230, 232) and control spaces (220, 222) of the shut-off chambers (210, 212) is limited to produce a maximum deformation of said one or more diaphragms into said product space of 20%.
- 15 27. Diaphragm pump according to Claim 26, wherein said maximum deformation is 10%.
- 20 28. Diaphragm pump according to Claim 27, wherein said maximum deformation is less than 5%.
- 25 29. Diaphragm pump according to Claim 26, wherein said travel is limited by dimensions of one or more of the shut-off chambers, pumping chamber, control spaces and product spaces